Status of the EMittance Transfer EXperiment EMTEX * †

M. Maier[1] *and L. Groening,* [1]*O. Kester,* [1]*H. Leibrock,* [1]*C. Muehle,* [1]*I. Pschorn,* [1]*P. Rottländer,* [1]*C. Will,* [1]*C. Xiao*[1]

[1]GSI Helmholtzzentrum für Schwerionenforschung GmbH, Darmstadt Germany

In order to improve the injection efficiency of the round UNILAC heavy ion beam into the asymmetric acceptance of the SIS18 it would be of great advantage to reduce the horizontal emittance at the expense of increasing the vertical emittance by the so called emittance transfer [1]. As proof of principle a test set has been proposed with the ion optical layout described in [2]. The status of the proposed beam line at the transfer channel shown in Figure [1] is reported.

Experimental Setup

The EMTEX setup is situated in the existing TK beam line and consists of two quadrupole doublets, a split solenoid magnet with a foil stripper in the centre to prepare and magnetize the beam and three triplets including a skew triplet to administer the emittance transfer. The existing transfer channel beam line is not affected and may be used with the stored accelerator settings. While the two last triplets including the skew triplet are of old GSI possession and were refitted in our workshop, all other components had to be ordered newly.

Status of the subsystems

The two triplets including the skew triplet have been available in house and where overhauled by the magnet engineering division ENMA and the mechanic workshop CSTI of GSI. They are installed in the TK5 beam line [2], commissioned, and ready for use.

Figure 1: Setup for the emittance transfer experiment in the transfer channel TK (red), while the existing beam line (black) is not affected.

The solenoid magnet [3] has been designed by ENMA at GSI and manufactured at Danfysik. The vacuum chamber of the solenoid is a special design comprising a view port for on-line observation of the foil. For this reason the inside of the vacuum chamber had to be blackened to reduce reflections. Yet another special solution had to be developed by the GSI construction department for the connection box for the thick water cooled power cables. The solenoid with

* Work supported by GSI(UNILAC) PSP code:2.14.11
† Work supported by Hic for Fair

Figure 2: The two existing, overhauled triplets installed in TK5. The first (left) triplet GTK5QT6 has been rotated by 45 degree to couple the x and y plane for the emittance transfer.

all components has been delivered, installed, and commissioned just in time.

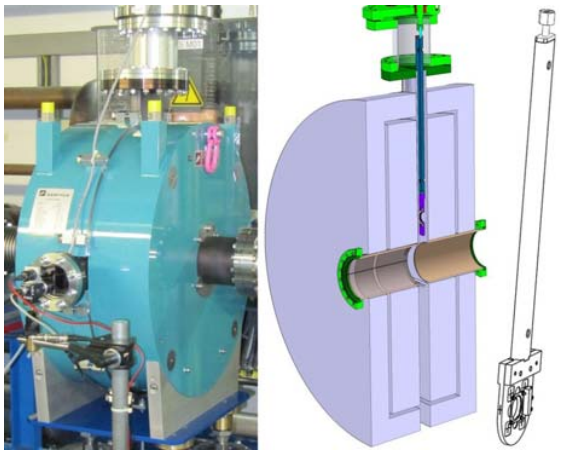

Figure 3: The solenoid installed in the beam line (left) and a schematic of the inner chamber and stripping foil arm (right).

Outlook

Unfortunately the delivery date for the quadrupoles has been delayed and they will be installed during the shutdown in May 2014. The first experimental run of EMTEX is scheduled for June 2014. In case of success it is foreseen to implement an emittance transfer setup in the HSI

References

[1] L. Groening, Phys. Rev. ST Accel. Beams 14, 064201 (2011)

[2] C.Xiao, L.Groening and O.Kester , Phys. Rev. ST Accel. Beams 16, 044201 (2013)